

REMARKS

This Response is offered in reply to the Office Action of Jan. 24, 2003. A petition and fee for a one month time extension are enclosed.

In paragraph 1a of the office action, claims 1-12 are rejected under 35 USC 112, second paragraph as indefinite. Applicants have amended the claims in a manner believed to overcome the Section 112 rejection. Reconsideration is requested.

In paragraph 3 of the office action, claims 1-12 are rejected under 35 USC 103(a) as obvious in view of Frank US Patent 4 837 187 or EP 0 914 883 taken with Japan document 3-97675.

Applicants respectfully disagree with this rejection. In particular, the examiner alleges that Frank discloses "a method of treating a ceramic core after molding and before firing for use in casting molten metallic material comprising the steps of placing the unfired ceramic core and having organic binder, thermosetting or thermoplastic, on one setter, then heating the unfired ceramic core to an elevated superambient temperature effective to perform the binder to reduce distortion of the unfired ceramic core". The examiner cites column 4, lines 38-41 and lines 60-67 as well as column 5, lines 6-33 of Frank.

Applicants firstly do not know what the examiner means when he alleges that Frank discloses "then heating the unfired ceramic core to an elevated superambient temperature effective to perform the binder to reduce distortion of the unfired ceramic core" (underlining added). The meaning of "to perform" is not understood by Applicants.

Moreover, the examiner is incorrect in alleging that Frank discloses "placing the unfired ceramic core and having organic binder, thermosetting or thermoplastic, on one setter". Frank discloses only a thermoplastic binder (e.g. thermoplastic wax-based binder at column 4, line 40) and not a thermosetting binder as recited in Applicants' claim 9. Claim 9 is believed to be incorrectly rejected in view of Frank as a primary reference.

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The examiner cites column 4, lines 38-41 and lines 60-67 as well as column 5, lines 6-33 of Frank.

Applicants would point out to the examiner that column 4, lines 38-41 and 60-67 relate to making a ceramic/binder mixture that is injected into a suitable die to mold a core shape and not to Applicants' claimed method that is practiced after molding and before firing of the ceramic core.

Further, Applicants would point out to the examiner that column 5, lines 6-22 relate to subjecting the green core removed from the die to a pre-bake treatment at 232 to 288 degrees C maximum temperature with graphite powder packing material covering the green core to extract or remove the thermoplastic wax-based binder from the ceramic core. In particular, column 5, lines 11-17 of Frank expressly teaches that "[a]fter the core is positioned on bottom half of the ceramic setter, the core is covered with a graphite powder packing material having a relatively fine particle size. During the prebake treatment, the graphite powder packing material serves to physically extract, via capillary action, the binder material from the core". The thermoplastic wax-based binder no doubt is liquid at the temperature of the prebake treatment to allow its extraction by the graphite powder packing material via capillary action as described at column 5, lines 11-17.

In contrast, Applicants pending claims recite, in combination with the other recited steps, heating the setter and the unfired ceramic core to an elevated temperature at or above the softening temperature of the organic binder effective to soften the organic binder to reduce distortion of the unfired ceramic core followed by removing the setter and the unfired ceramic core having softened organic binder from the oven to cool to ambient temperature.

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The examiner should not ignore the recitations in Applicants' claims that the organic binder is softened to reduce distortion of the unfired ceramic core and that the setter and the unfired ceramic core having softened organic binder are removed from the oven to cool to ambient temperature. These recitations are not disclosed or suggested by Frank.

Moreover, claim 6 recites that the unfired ceramic core conforms to a surface of at least one setter by being heated to the elevated temperature at or above the softening temperature of the binder. The Frank patent states at column 5, lines 8-11 that setter enables the ceramic core "to retain its shape during subsequent processing". There is no disclosure or teaching in Frank of Applicants' claim 6 conforming the ceramic core to the setter surface by softening of the organic binder of the ceramic core.

These features of Applicants' pending claims are not disclosed or even suggested in Frank, which teaches away from Applicants' claims in removing the thermoplastic wax-based binder in the prebake treatment as described at column 5, lines 11-17 of the patent.

The Frank patent thus is grossly deficient with respect to Applicants' pending claims.

The EP patent is likewise grossly deficient. In particular, page 4, lines 15-21 of the EP patent referred to by the examiner relate to making a ceramic/thermoplastic wax-based binder mixture that is injection molded in a suitable die to mold an original core shape.

Page 4, lines 15-21 of the EP patent do not relate to Applicants' method which occurs after molding of the green ceramic core and before firing of the green ceramic core.

The examiner's attention is directed to this gross deficiency of the EP patent and the apparent misunderstanding of the EP patent on the examiner's part vis-a-vis Applicants' claimed method which occurs after molding of the green ceramic core and before firing of the green ceramic core.

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The EP patent does not disclose or remotely suggest Applicants' method of claims 1-12. Applicants further note that the EP patent, like the Frank patent, employs a thermoplastic wax-based binder and not a thermosetting binder as set forth in claim 9. Moreover, the EP patent, like the Frank patent, does not disclose or remotely suggest conforming a ceramic core to a setter surface by softening of the organic binder of the ceramic core as recited in Applicants' claim 6.

Thus, both the primary Frank reference patent and the primary EP reference patent are grossly deficient with respect to Applicants' pending claims.

The cited Japanese document does not remedy the gross deficiencies of the Frank patent or the EP patent. The Japanese document involves high temperature sintering through firing of ferrite cores in oxygen-containing gas to produce high permeability cores as expressly described in the translation of the abstract provided by the examiner. A temperature of 1350 degrees C appears on page 455, right hand column, line 8 of the untranslated Japan document.

Moreover, the combination of the Japanese document with the Frank patent or the EP patent as proposed by the examiner is believed incorrect since the Japanese document involves firing at very high temperatures and the pre-bake treatment of Frank and EP patent requires graphite powder packing material covering the green core to extract the organic binder from the ceramic core before firing. Applicants fail to see any motivation to combine the Japanese document with the Frank patent or the EP patent.

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Reconsideration of the Section 103 rejection of claims 1-12 is requested. Allowance of pending claims 1-12 is requested.

Respectfully submitted,



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CERTIFICATE OF MAILING

I hereby certify that this correspondence and enclosures are being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on April 30, 2003.



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